

AEDES (FINLAYA) JAPONICUS JAPONICUS (THEOBALD), A NEW INTRODUCTION INTO THE UNITED STATES¹

E. L. PEYTON,² SCOTT R. CAMPBELL,³ THOMAS M. CANDELETTI,⁴ MICHAEL ROMANOWSKI⁴
AND WAYNE J. CRANS⁵

ABSTRACT. *Aedes (Finlaya) japonicus japonicus* is recorded for the 1st time in the United States. Four adult females were collected in light traps at 2 sites in New York and one site in New Jersey during the months of August and September 1998. Notes on bionomics are provided. Illustrations of the adult female, male, and larva are included.

KEY WORDS *Aedes japonicus japonicus*, United States, 1st record, bionomics, illustrations of adult and larva

INTRODUCTION

Evidence suggesting established, propagating populations of *Aedes (Finlaya) japonicus japonicus* (Theobald) in New Jersey and New York is reported here for the first time.

MATERIALS AND METHODS

One female of *Ae. j. japonicus* was captured in a Centers for Disease Control (CDC) light trap on August 13, 1998, in Southold, Suffolk County, NY (41°03'N, 72°24'W). On September 18, 1998, a 2nd female was captured at the same site and a 3rd female was captured in a New Jersey light trap at Brookhaven, Suffolk County, NY (40°46'N, 72°55'W). These sites are located in coastal, rural residential areas on eastern Long Island. A 4th female was captured in a New Jersey light trap on September 17, 1998, at Colliers Mills, Ocean County, NJ. This site is in a rural area on the northern border of the New Jersey Pine Barrens (40°04'N, 74°26'W). Suitable containers that could serve as possible larval habitats were sampled at this site, and yielded larvae of *Aedes triseriatus* (Say), *Culex restuans* Theobald, and *Toxorhynchites rutilus septentrionalis* (Dyar and Knab). No prey larvae were present in the container with *Toxorhynchites*. Although the above adult specimens suffered the usual damage expected in light trap collections, critical morphologic characters for the accurate identification of this subspecies were intact. One of the above females is retained as a voucher at the Na-

tional Museum of Natural History, Walter Reed Biosystematics Unit (WRBU).

DISCUSSION

Aedes japonicus japonicus is one of 4 subspecies treated in Tanaka et al. (1979). This subspecies is known from Korea (Peninsula and Cheju Do) and Palearctic Japan (Hokkaido, Honshu, Shikoku, Kyushu, Yakushima, and Tsushima) where Tanaka et al. (1979:312, 315) stated that it is one of the most common mosquitoes. The subspecies has also been reported from the USSR by Gutsevich and Dubitskiy (1981). According to Tanaka et al. (1979),

Larvae occur in a wide variety of natural and artificial containers, usually preferring shaded places and water containing rich organic matter, rock holes appear to be the most favored immature habitat for this subspecies. They are found from early spring to early autumn in Central Japan. Adults live in forested areas and are day biters, but are apparently reluctant to bite man. However, in the laboratory, they readily feed on chicks and mice, but not on reptiles or amphibians (Miyagi, 1972). They overwinter as eggs in northeastern Japan and as larvae in southwestern Japan (Kamimura, 1976b).

Kamimura (1968) observed a large number of females coming to attack him in a forested area of Teine, Hokkaido, in early spring. Miyagi (1971: 147) reported capturing 2 females coming to bite humans inside a house near a cemetery at night, and he also collected females attracted by dry ice in the forest of Nagasaki, Japan, in early spring. In a personal communication to E.L.P. (January 27, 1999), Miyagi states again that he has very often experienced females of *Ae. j. japonicus* biting him in the forest in Nagasaki. This seems to reinforce the idea that if humans are available as hosts, this mosquito will most likely feed on them. LaCasse and Yamaguti (1948:68) reported collecting larvae above 1,219 m. The wide variety of natural and artificial container habitats listed for this subspecies in LaCasse (1948:50, Fig. X) nearly mirrors that reported for the more well-known *Aedes (Stegomyia) aegypti* (Linnaeus) and *Aedes (Stegomyia) albopictus* (Skuse). This brings us to the conclusion

¹ The views of the authors do not purport to reflect the views of the supporting agencies.

² Walter Reed Biosystematics Unit, Museum Support Center, Smithsonian Institution, Washington, DC 20560.

³ Suffolk County Department of Health Services, Entomology Laboratory, 335 Yaphank Avenue, Yaphank, NY 11980-9744.

⁴ Ocean County Mosquito Extermination Commission, PO Box 327, Barnegat, NJ 08005-0327.

⁵ Rutgers, The State University of New Jersey, Department of Entomology, 180 Jones Avenue, New Brunswick, NJ 08901-8536.

Report Documentation Page			<i>Form Approved OMB No. 0704-0188</i>	
<p>Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.</p>				
1. REPORT DATE 1999	2. REPORT TYPE		3. DATES COVERED 00-00-1999 to 00-00-1999	
4. TITLE AND SUBTITLE Aedes (Finlaya) Japonicus (Theobald), A New Introduction into the United States			5a. CONTRACT NUMBER	
			5b. GRANT NUMBER	
			5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)			5d. PROJECT NUMBER	
			5e. TASK NUMBER	
			5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Smithsonian Institution, Walter Reed Biosystematics Unit, Washington, DC, 20560			8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)			10. SPONSOR/MONITOR'S ACRONYM(S)	
			11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited				
13. SUPPLEMENTARY NOTES				
14. ABSTRACT see report				
15. SUBJECT TERMS				
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT Same as Report (SAR)	18. NUMBER OF PAGES 4
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified		

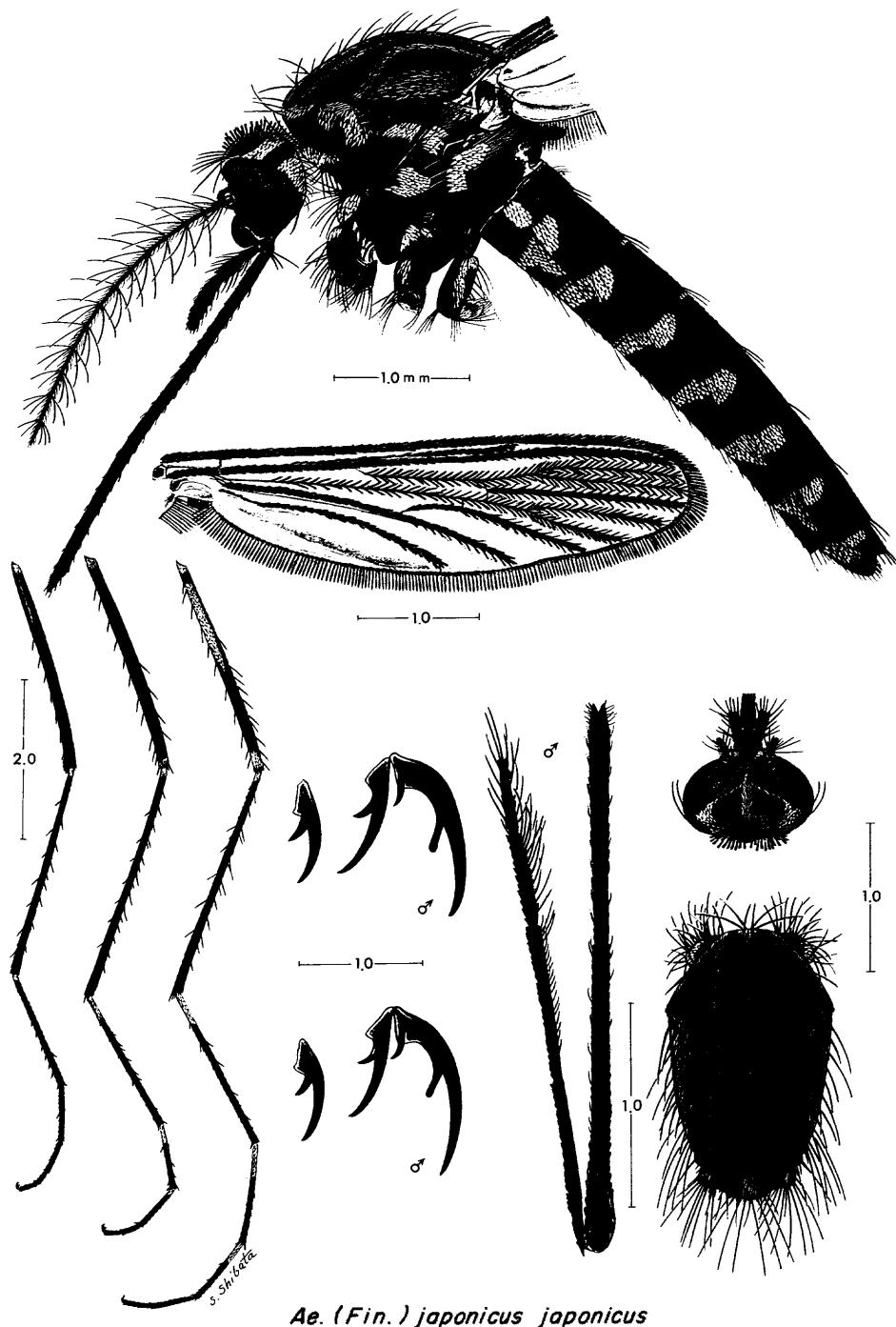


Fig. 1. Adult female habitus; male proboscis, maxillary palpus, fore- and midfemora.

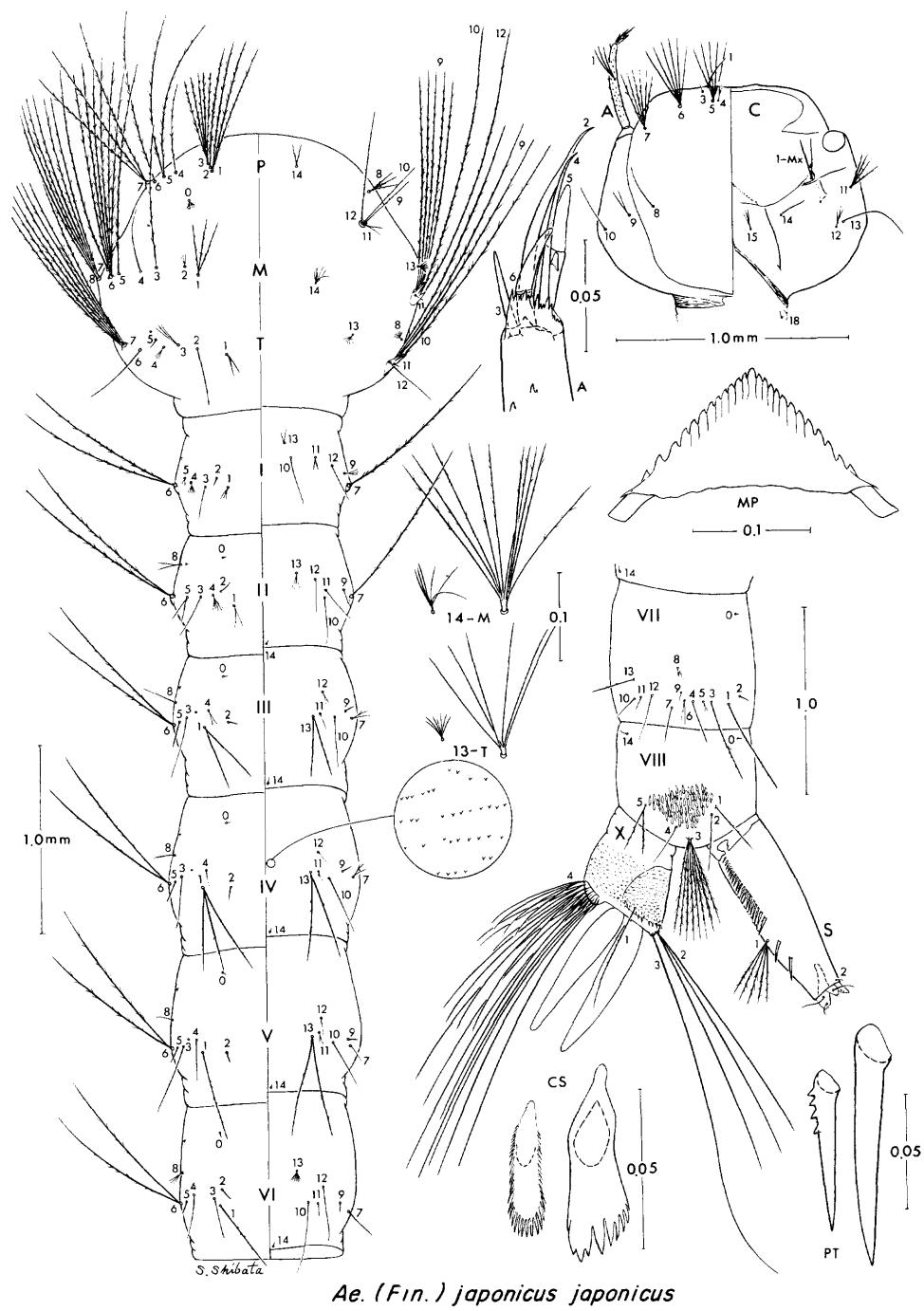


Fig. 2. Fourth instar showing complete chaetotaxy.

that the most likely mode of introduction into the United States for *Ae. j. japonicus* may have been through the used tire trade.

We know little of the medical importance of the subspecies. Preliminary studies by Takashima and Rosen (1989) showed that *Ae. j. japonicus* had a vector competence to transmit Japanese encephalitis virus horizontally to mice and the capability to transmit the virus vertically to its offspring.

Because the 987-page book by Tanaka et al. (1979) is not readily available to North American workers, we are including their original drawings of the adult female, male, and larva (Figs. 1 and 2 here), so that the subspecies can be identified. These plates are deposited at the WRBU. With the aid of these superb drawings, identification of this mosquito should be relatively easy. We have not suggested characters for insertion in the Darsie and Ward (1981) key to North American mosquitoes because it is being revised.

We thank Ronald A. Ward and Richard C. Wilkerson for their helpful comments and review of the manuscript; Richard F. Darsie, Jr., for recommending that the mosquito specimens be sent to the WRBU for identification; and James Pecor (WRBU), Jim Dantonio, and Tom Iwanejko (SCDPW) for their technical assistance.

REFERENCES CITED

- Darsie, R. F., Jr., and R. A. Ward. 1981. Identification and geographical distribution of the mosquitoes of North America, North of Mexico. *Mosq. Syst.* 1 (Suppl.):1-313.
- Gutsevich, A. V. and A. M. Dubitskiy. 1981. New species of mosquitoes in USSR fauna. Nauka, Leningrad, Russia. [In Russian.]
- Kamimura, K. 1968. The distribution and habit of medically important mosquitoes of Japan. *Jpn. J. Sanit. Zool.* 19:15-34. [In Japanese.]
- Kamimura, K. 1976. On the Japanese species of the family Culicidae, pp. 150-188. In: M. Sasa, T. Kurihara and K. Kamimura (eds.). *Science of mosquitoes*. Hokuryukan, Tokyo, Japan. [In Japanese.]
- LaCasse, W. J. 1948. Mosquito fauna of Japan and Korea. Part I. Mosquito survey data on Japan and their application in the control of mosquito-borne diseases. Off. Surg., HQ 1 Corps APO 301 (Japan).
- LaCasse, W. J. and S. Yamaguti. 1948. Mosquito fauna of Japan and Korea. Part II. Off. Surg., HQ 1 Corps APO 301 (Japan).
- Miyagi, I. 1971. Notes on the *Aedes (Finlaya) chrysolineatus* subgroup in Japan and Korea (Diptera: Culicidae). *Trop. Med.* 13:141-151.
- Miyagi, I. 1972. Feeding habits of some Japanese mosquitoes on cold-blooded animals in the laboratory. *Trop. Med.* 14:203-217.
- Takashima, I. and L. Rosen. 1989. Horizontal and vertical transmission of Japanese encephalitis virus by *Aedes japonicus* (Diptera: Culicidae). *J. Med. Entomol.* 26: 454-458.
- Tanaka, K., K. Mizusawa and E. S. Saugstad. 1979. A revision of the adult and larval mosquitoes of Japan (including the Ryukyu Archipelago and the Ogasawara Islands) and Korea (Diptera: Culicidae). *Contrib. Am. Entomol. Inst. (Ann Arbor)* 16:1-987.